

Medical care of the South African Olympic team — the Sydney 2000 experience

W E Derman (MB ChB, BSc (Med) (Hons), PhD, FACSM)

Research Unit for Exercise Science and Sports Medicine, Sport Science Institute of South Africa, Cape Town

Abstract

Objective. This descriptive study was undertaken to report the medical care and injuries sustained by the athletes and officials of the South African Team at the 2000 Olympic Games and to provide data for planning future events.

Setting. Retrospective review of medical records at the South African medical facility, 2000 Olympic Games, Sydney, Australia.

Methods. Total number of consultations and diagnoses were ascertained from medical logs and patient files which were completed daily by the members of the medical team. Acute and chronic soft tissue (muscle strain, ligament sprain, tendon injury, contusion or laceration) and bony injuries were analysed in terms of nature of injury, grading of severity and anatomical region injured.

Main outcome measures. Number of consultations due to medical complaints or injuries amongst athletes and officials.

Results. A total of 348 medical consultations were logged during the time in Australia. Seventy-nine per cent of consultations were with athletes and the remainder (21%) with officials. Despite a comprehensive allergy screening and management programme, the most common medical complaints were respiratory (16%), ENT (18%), and neurological (16%) in nature whilst acute injury and chronic injury accounted for 17% and 14% of consultations respectively. The most common acute and chronic injuries were soft tissue injuries. The most common acute injury regions were the foot and ankle (20%), hand and wrist (20%) and knee (14%). Eighty per cent of acute injuries

were grade I, 14% grade II and 6% grade III. The most common chronic injury regions were foot and ankle (31%), shoulder (16%), knee (16%) and lumbar spine (13%).

Conclusions. The nature of consultations suggest that it should be a prerequisite for doctors accompanying sports teams to multi-coded events to have a broad sports medicine knowledge of both medical and injury management of athletes. Furthermore, a sound knowledge of the management of soft tissue injury particularly in the hand and wrist, and foot and ankle regions is an important prerequisite. These data should be useful for planning medical services for future multi-coded events.

Introduction

The 2000 summer Olympic Games in Sydney Australia was clearly the largest event in sporting history and South Africa was represented by the largest team of athletes and officials ever to leave these shores. In accordance with the size of the team and in keeping with International Olympic Committee (IOC) allocations, the medical team was the largest ever to be assembled for the South African team competing at the Olympic Games. As space on the medical team is very limited, the correct balance of medical service provision remains a difficult endeavour.^{1,2}

In total, the medical team comprised 13 members including 4 sport physicians, 7 physiotherapists, a sports psychologist and an athletic trainer/biokineticist trained in massage therapy. One physician and 1 physiotherapist were seconded to the soccer team and they accompanied this squad until the latter were eliminated from the competition and returned home. The statistics from this squad are not included in this report.

This report describes the preparation programme of the Olympic athletes and also describes the nature and profiles of the consultations for both the athletes and officials. The objectives of this report are therefore to examine the delivery of medical services and to provide data for planning of medical support to future multi-coded sports events of this nature.

Methods

The medical records and histories of athletes were obtained through clinical evaluation opportunities during the work-up in the Operation Excellence programme and at the 3 preparation camps provided by the National Olympic Committee of South Africa (NOCSA).

At each opportunity a hardcopy medical record was completed and the data transferred to an electronic database. This

CORRESPONDENCE:

W Derman
Research Unit for Exercise Science and Sports Medicine
Sport Science Institute of South Africa
Boundary Road
Newlands
7700
Cape Town
Tel: 021-650 4560
Fax: 021-686 7530
E-mail: wderman@sports.uct.ac.za

medical database was taken to Australia.

Athletes were defined as the members of the team engaged in competition and officials were defined as team or athlete coaches, team managers, team technical staff, administration officials, medical staff and National Olympic Committee members.

We used data from patient files and medical and physiotherapy encounter forms to determine the use of the medical services. Data were collected over 26 days, starting when the team arrived in Australia (4 September) until the end of the Olympic Games (30 September). The nature of injury, medical complaint, or treatment was recorded on a specially designed encounter form, at the time of examination or treatment by the examining physician. The datasheets were collected, and retrospective analysis was performed using the encounter forms and patient files.

The term 'injury' was defined as any complaint that required medical diagnosis and management. Acute injury was defined as any new injury that required medical or physiotherapy intervention and was subsequently graded I, II or III. Grade I injuries required on-field intervention but the athlete was able to continue competition or training, grade II injuries required that the athlete be removed from participation or training for less than 48 hours, and with grade III injuries the athlete was unable to participate in training or competition for more than 48 hours. Chronic injuries were defined as either pre-existing injury or an acute injury requiring ongoing medical evaluation and management.

Results

Olympic preparation programme

Medical and scientific preparation of the team began in 1999 with some members of the potential Olympic squad joining Operation Excellence, the preparation programme of NOCSA. Athletes underwent medical and scientific evaluations both regionally (between January 1999 and March 2000) and at three camps: the first in Cape Town in March 2000, the second in Durban in June 2000 and the third in Johannesburg in September 2000.

The nature and number of evaluations are listed in Table I.

TABLE I. Medical and physiological services provided to 130 athletes during Operation Excellence prior to Sydney 2000 (N)

Services	Regional	Camp 1- Cape Town	Camp 2 - Durban
Medical (individual)	35	96	120
Dental (individual)	-	46	85
Dietary (individual)	25	45	21
Dietary (group WS)	-	2	2
Performance testing	35	96	120
Sport psychology (individual)	20	58	24
Sport psychology (group WS)	-	2	2
Sports vision testing	21	60	-
Physiotherapy treatments	48	75	111

WS = workshop.

In total over 251 individual medical assessments and screening procedures were conducted between January 1999 and departure for the Olympic games. Over 130 athletes from 15 different codes were assessed during this time. The programme included not only medical but also dietary, physiological, psychological and dental evaluations.

Consultations and treatments during the Olympic Games

In total 129 athletes from 12 sports codes and 70 officials travelled to Sydney. Eighteen soccer players and 6 officials left Sydney the day after arriving to play at the various venues around Australia and their medical evaluation data are therefore not included in this report.

Three hundred and forty-eight formal medical consultations were conducted in the 27-day period between 4 and 30 September. Of these consultations 79% (275 consultations) involved athletes and 21% (73 consultations) involved officials. The daily rate of consultations averaged 13 per day. This figure does not include informal consultations by the doctors in the physiotherapy rooms, patients consulted at the fieldside, at the poolside, at the track or at other venues. Furthermore, the rate of daily medical consultations during this period is shown in Fig. 1. It is noted from this figure that there were two distinct periods of increased rates of consultation, namely for 2 days after arrival, and during days 17 through 23.

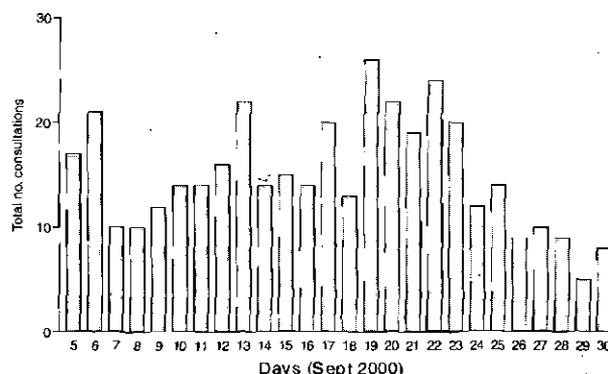


Fig. 1. Rate of consultations during the Olympic Games, September 2000.

The nature of the main complaints requiring medical consultation is displayed in Fig. 2. Sixty-nine per cent of all consultations resulted from a medical (non-injury) complaint, whilst 31% of all consultations were due to injury. The main medical complaints were respiratory (16%), neurological (16%) and ENT (18%) in nature. Acute and chronic injury accounted for 17% and 14% of consultations respectively. Data detailing acute and chronic injury and the anatomical distribution of the complaint are listed in Tables II and III.

Skeletal muscle strain injuries and ligamentous sprain injuries accounted for 30% and 24% of all acute injuries, whilst contusion injuries constituted 26% of all acute injuries. Lacerations, abrasions and acute tendon injuries accounted for the remainder of the acute injuries. The most common anatomical areas injured acutely were foot and ankle (20%) and wrist and hand (20%). Knee injuries accounted for 14% of injuries and the lower leg 10%. Eighty per cent of the acute

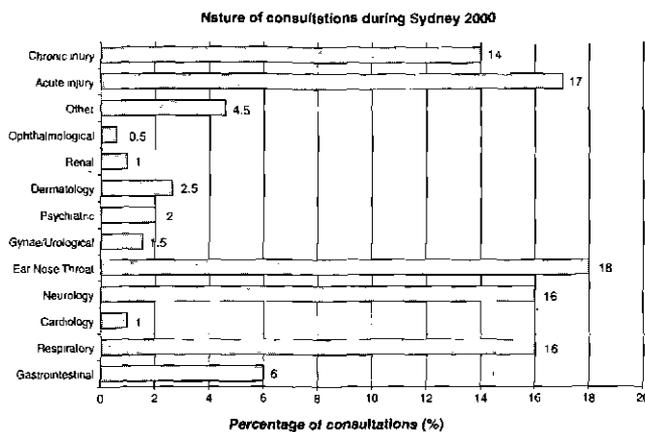


Fig. 2. Percentage of consultations due to injury or various medical complaints during the Sydney 2000 Olympic Games

injuries were classified as grade I injuries, 14% as grade II, and 6% as grade III injuries.

Tendon injuries and ligamentous injuries accounted for 41% and 31% of the chronic injuries reported, with chronic

skeletal muscle injuries accounting for 19% of the injuries. Only 6% of chronic injuries were bony injuries.

The most common anatomical sites injured were foot and ankle (31%), shoulder (16%) and knee (16%) whilst lower back pain accounted for 13% of chronic injuries.

Imaging studies and specialist consultations

Fourteen X-rays, 8 soft-tissue high resolution ultrasound investigations, 1 CT scan and 7 MRI scans were performed by the Sydney Olympic Committee for the Olympic Games (SOCOG) medical imaging department for the South African team during the 27-day period. Two orthopaedic opinions were sought and provided by SOCOG clinical services.

Discussion

The medical team in support of Team South Africa for the Sydney 2000 Olympic Games was in a fortunate situation as the majority of the athletes were examined in the regional evaluations and pre-Olympic camps in preparation for the event. Indeed, 251 such medical evaluations were performed in the Operation Excellence programme. This programme provided the South African athletes with the opportunity for medical intervention that is not provided as routine care in the

TABLE II. Acute injury by anatomical region during the Sydney 2000 Olympic Games (N)

	Muscle strain	Ligament sprain	Tendon injury	Contusion	Laceration	Abrasion	TOTAL	%
Head & neck	2	0	0	1	0	0	3	6
Lumbar spine	2	1	0	0	0	0	3	6
Hip & pelvis	1	0	0	0	0	1	2	4
Shoulder	2	0	0	1	0	0	3	6
Upper limb	2	0	0	0	0	1	3	6
Wrist & hand	0	5	0	2	3	0	10	20
Upper leg	3	0	0	1	0	0	4	8
Lower leg	2	0	0	3	0	0	5	10
Knee	0	3	1	2	0	1	7	14
Foot & ankle	1	3	3	3	0	0	10	20
TOTAL	15	12	4	13	3	3	50	
%	30	24	8	26	6	6		

TABLE III. Chronic injury by anatomical region sustained during the Sydney 2000 Olympic Games (N)

	Muscle Injury	Ligament injury	Tendon injury	Bony injury	Other	TOTAL	%
Head & neck	0	0	0	0	0	0	0
Lumbar spine	0	4	0	0	0	4	13
Hip & pelvis	0	0	0	1	0	1	3
Shoulder	2	0	3	0	0	5	16
Upper limb	1	0	2	0	0	3	9
Wrist & hand	0	2	0	0	0	2	6
Upper leg	1	0	0	0	0	1	3
Lower leg	1	0	0	0	0	1	3
Knee	0	0	4	1	0	5	16
Foot & ankle	1	4	4	0	1	10	31
TOTAL	6	10	13	2	1	32	
%	19	31	41	6	3		

preparation of many countries.^{7,12} For the first time in the history of South African sport, dental evaluations were provided for the athletes as part of the preparation programme as dental problems have been shown to be common in this group of individuals.^{10,11}

The first important finding of this study was there were about 13 formal medical consultations per day during the Olympic Games. This figure is similar to those reported by the medical teams of other countries.^{1,4,12} Although the total number of consultations was 348 for the duration of the Games, this figure did not include 'informal' consultations that occurred at the fieldside, poolside and trackside. Had these consultations been added the figure might have been far larger.

The second important finding of this study is that the majority of consultations were not due to injury. Indeed, a large percentage of consultations were related to ENT complaints (18% of consultations) and respiratory complaints (16% of consultations). This finding occurred despite a thorough allergy detection and management programme which was instituted 3 months prior to the Olympic Games in response to the high pollen counts which were detected around the Olympic Village in springtime^{3,8} and the finding that nearly 60% of the South African Olympic team had an atopic disposition.^{5,6} It is therefore possible that a much higher number of consultations for ENT and respiratory complaints could have occurred had the prevention programme not been instituted.

Although 31% of all consultations were due to sports injury, the vast majority of these were of minor severity. Despite the comprehensive preparation programme, chronic injury accounted for 14% of all consultations of the medical team. Therefore the goal of taking a completely injury-free team to this event was not achieved as chronic injuries were present despite rehabilitation provision for a year prior to the event. This finding supports the role of the travelling biokineticist in the medical team who is able to treat athletes in different phases of rehabilitation during a long competition.

Assessment of the injury and medical statistics allows for good planning when considering the choice of a medical team for a multi-coded sporting event.^{1,2} In retrospect the allocation of 3 sports physicians to the 111 athletes and 70 officials on the team was adequate. Thus the ratio of 1 doctor for every 50-60 team members as suggested by the IOC is correct. Due to the profile of consultations depicted in Fig. 2, team physicians should ideally have good skills with respect to both injury diagnosis and management and general sports medicine. Indeed, good skills with respect to ENT, respiratory and neurological aspects of sports medicine are important. With respect to sports injuries, knowledge and skills in the management of mostly soft tissue injury, particularly of the foot and ankle, wrist and hand, and the knee regions are also important.

As noted in Fig. 1, medical staff should anticipate a high number of consultations upon arrival at the destination as many athletes and officials present with signs and symptoms of jet-lag. This is probably only seen in sports events when many time-zones have been crossed during travel to the destination.⁹ A further peak in the number of consultations is noted as the track and field competition gets underway, and other sport disciplines enter their final phase of competition.

In conclusion, this study describes the medical care provided to the athletes and officials of the South African team to the Olympic Games in Sydney 2000. Injury and illness rates were comparable to those noted in other teams. The analysis of the nature of consultations suggests that it should be a prerequisite for doctors travelling with a team to multi-coded events to have a broad knowledge of both medical and injury management of athletes. Furthermore, a sound knowledge of the management of soft tissue injury, particularly in the hand and wrist and foot and ankle regions is an important prerequisite for the personnel of the medical team.

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REFERENCES

1. Budgett R, Harries M, Aldridge J, Jaques R, Jennings DE. Lessons learnt at the 1996 Atlanta Olympic Games. *Br J Sports Med* 1997; **31**: 76.
2. Crichton K. Putting together a medical team for the Olympic and Paralympic games. *Aust Fam Physician* 2000; **29**: 611-3.
3. Fitch KD. Management of allergic Olympic athletes. *J Allergy Clin Immunol* 1984; **73**: 722-7.
4. Hanley DF. Medical care of the US Olympic Team. *JAMA* 1976; **236**: 147-8.
5. Hawarden D, Baker S, Toerien A, et al. Atopy in South African Olympic athletes. *S Afr Med J* 2002; **92**: 355-6.
6. Hawarden D, Baker S, Toerien A, et al. Atopy in South African Olympic athletes: A preliminary report. *Current Allergy and Clinical Immunology* 2000; **13**(2): 4-5.
7. Jegathesan M. Pattern of injuries and illnesses in the Malaysian Olympic Team. *Med J Malaysia* 1973; **27**: 248-52.
8. Katelaris CH, Carrozzi FH, Burke TV, Byth K. A springtime olympics demands special consideration for allergic athletes. *J Allergy Clin Immunol* 2000; **106**: 260-6.
9. Shaw M, Leggat PA. Traveling to Australia for the Sydney 2000 Olympic and Paralympic Games. *Journal of Travel Medicine* 2000; **7**: 200-4.
10. Soler BD, Batchelor PA, Sheiham A. The prevalence of oral health problems in participants of the 1992 Olympic Games in Barcelona. *Int Dent J* 1994; **44**: 44-8.
11. Stiel D, Trethowan P, Vance N. Medical planning for the Sydney 2000 Olympic and Paralympic Games. *Med J Aust* 1997; **167**: 593-4.
12. Wetterhall SF, Coulombier DM, Herndon MJ, Zaza S, Cantwell JD. Medical care delivery at the 1996 Olympic Games. Centers for Disease Control and Prevention Olympics Surveillance Unit. *JAMA* 1998; **279**: 1463-8.